

What is claimed is:

1. An isolated nucleic acid molecule comprising a polynucleotide selected from the group consisting of:

(a) a polynucleotide or a conservatively modified variant thereof having 95% sequence identity to SEQ ID NO:1;

(b) a polynucleotide or a conservatively modified variant thereof having the sequence of SEQ ID NO:1;

(c) a polynucleotide or a conservatively modified variant thereof that encodes a polypeptide having 95% sequence identity to SEQ ID No:2;

(d) a polynucleotide or a conservatively modified variant thereof that encodes a polypeptide that retains similar biological activity as the unmodified sequence of SEQ ID NO:2;

(e) a polynucleotide encoding a polypeptide of SEQ ID NO:2;

(f) a polynucleotide that hybridizes under high stringency conditions to the polynucleotide of SEQ ID NO:1; and

(g) a polynucleotide complementary to a polynucleotide of (a) through (f).

2. A recombinant expression cassette comprising the isolated nucleic acid molecule of claim 1.

3. A vector comprising the recombinant expression cassette of claim 2.

4. A host cell comprising the vector of claim 3.

5. The isolated polynucleotide of claim 1 wherein the polypeptide has expansin activity.

6. A group 2/3 allergen encoding a polypeptide selected from the group consisting of: SEQ ID NO:2, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, and SEQ ID NO:18.

7. A group 2/3 allergen encoding a polypeptide comprising SEQ ID NO:2.
8. An isolated polypeptide comprising a polypeptide selected from the group consisting of:
- 5 (a) a polypeptide or a conservatively modified variant thereof having 95% sequence identity SEQ ID NO:2;
- (b) a polypeptide or a conservatively modified variant thereof having the amino acid sequence of SEQ ID NO:2;
- (c) a polypeptide or a conservatively modified variant that that retains similar
- 10 biological activity as the unmodified sequence of SEQ ID NO:2; and
- (d) a polypeptide which is encoded by the polynucleotide of SEQ ID NO: 1.
9. An antibody which selectively binds to the polypeptide of claim 8.
- 15 10. An isolated polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1, and which encodes a protein having expansin activity.
11. An isolated polynucleotide having at least 95% sequence similarity to SEQ ID NO: 1 and which encodes a protein having expansin activity.
- 20 12. An isolated polynucleotide that encodes a polypeptide of SEQ ID NO:2 wherein the polypeptide has expansin activity.
13. A group 2/3 allergen isolated from grass pollen wherein the allergen possesses
- 25 expansin activity.
14. A group 2/3 allergen isolated from grass pollen wherein the allergen possesses expansin activity and has an N-terminal amino acid sequence set forth in SEQ ID NO:5.
- 30 15. An isolated group 2/3 allergen having expansin activity and more than one aromatic residue on its protein surface.

16. An isolated group 2/3 allergen that has the ability to enhance the wall-loosening activity of a β -expansin in plant wall extension and stress relaxation activity.

17. The group 2/3 allergen of claim 16 wherein the enhancement is synergistic.

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18. The group 2/3 allergen of claim 16 wherein said protein has wall loosening activity by itself.

19. The group 2/3 allergen of claim 18 wherein the group 2/3 allergen is Lol p 3.

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20. A group 2/3 allergen that possesses expansin activity and is not affected by dithiothreitol (DDT).

21. A group 2/3 allergen having expansin activity and at least 40% sequence similarity to a carboxy terminus of a grass pollen group 1 allergen.

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22. A method of modifying cells walls in the tissues of a transgenic plant, the method comprising:

introducing into a plant an expression cassette comprising a promoter active in cells of plants operably linked to a group 2/3 allergen polynucleotide which specifically hybridizes to SEQ ID NO:1 under stringent conditions.

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23. A method of weakening the mechanical strength of cellulose fibers, the method comprising:

contacting a quantity of cellulose with a composition having a polypeptide comprising an amino acid sequence of SEQ. ID. NO:2.

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24. A method of modifying plant cell walls, the method comprising:

introducing into a plant a polynucleotide sequence that encodes a polypeptide sequence comprising SEQ ID NO:2, the method comprising:

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cultivating the plant under conditions suitable for plant growth and production of the

polypeptide;
harvesting the plant; and
recovering the polypeptide.

- 5 25. A method for producing a polypeptide having expansin activity comprising:
- (a) cultivating the host cell of claim 4, under conditions suitable for production of the
 polypeptide; and
- (b) recovering the polypeptide.

- 10 26. A transgenic plant cell comprising a nucleic acid comprising the sequence of SEQ
 ID NO:1.

27. A transgenic plant with a genome comprising a nucleic acid comprising the
sequence of SEQ ID NO:1 that possess expansin activity.

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28. Seeds of the plant of claim 27 which carry the DNA construction in their genome.

29. A transgenic plant comprising an expression cassette operably linked to a group 2/3
allergen polynucleotide which specifically hybridizes to SEQ ID NO:1 under stringent
20 conditions.